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One Building at A Time for Tambak Lorok

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Abstract — Global warming causes climate change and sea level rise. This is a threat for coastal regions, especially for coastal settlements with activities that are influenced by this natural phenomenon. Consequences are damage of houses, humid house environment, sustainability of the houses, obstructed economic activities and domestic works, disruption of sanitation facilities, lack of electricity, failure of transport system, psychological issues and other. Icons Tambak Lorok as " Fisherman Village " is not something familiar to residents of the city of Semarang . Especially for the housewife who every day have to buy the ingredients high in protein and omega fish auction which is adjacent to the main street market in the village of Tambak Lorok. However, there are major problems that are being experienced by this small neighborhood. In fact, this issue includes seven infrastructure that should spoil the fishermen in activity with marine life. With this research we will investigate water urbanism and climate change resiliency in Semarang, specifically the traditional fisher community of Tambak Lorok. We intend to find out how the local people in the fisher settlement Tambak Lorok deal with water urbanism, proper and living with floods. So, we have a good solution for this problem, Floating Stage. We think that Tambak Lorok need a new design for the common future. With this, One Building at A Time for Tambak Lorok, will be a good solution.

Keywords: *Fisher community, Environment, Climate Change, Settlement.*

1. Introduction

Territorial sea area of 5.8 million km2 or 63% of the total territory of Indonesia, with extensive Exclusive Economic Zone of 2.7 million km2 and a coastline of 95 181 km (Numberi, 2009). Making the coastal areas of Indonesia has the potential of natural resources such high mangroves, coral reefs and sea grass beds. According Supriharyono (2007), this region is very productive with the existence of estuaries, mangroves, seagrass beds and coral reefs, so such a long coast of Indonesia is a potential major natural resources for economic development.

Semarang with an area of 37.370 square kilometres is the fifth largest Indonesian cities and the capital of Central Java. For Semarang we are talking about the sea level rising up to 50 cm, lasting one day, occurring 80 times a year. Concering this frequency and length of flood can be concluded that Semarang has the highest risk of impact of sea water intrusion.

Not only in rainy season but also in drying season, flood and sea water intrusion are daily problem of Semarang. Indonesia have a different types of flooding. For example, because climate change, sea level intrusion, and also in drying season flooding always comes.

The other problem in Tambak Lorok is urban-scale. This caused population growth and decrease of land water catchment. And it makes the fishercommunity can’t managing the economic development there.

Figure 1. Map of Tambak Lorok

2. Methodology

This paper not only focus on planning the attention of the construction sector alone. It gives continuity value functions between the various sectors of life. So in this paper the design of the author not only focus on one area of science. Methods in writing this paper is to conduct a literature review and search reading sources over the internet. In the method of data analysis, the authors use qualitative data in analyzing the data. Qualitative data were analyzed with data reduction and data presentation. This process produces an empirical generalization that is the answer to the question the author.

Authors conducted all research activities at the end of August to November, so the author can manage all stages of the research effectively and efficiently.

3. Fundamental Theory

Many of us have this idea that floods (or flooding) is simply, too much water around your house. People think that can be fun. Wrong. Flooding is a lot more than that. Flooding is extremely dangerous and has the potential to wipe away an entire city, coastline or area, and cause extensive damage to life and property. It also has great erosive power and can be extremely destructive, even if it is a foot high.

Urban flooding is the inundation of land or property in a built environment, particularly in more densely populated areas, caused by rainfall overwhelming the capacity of drainage systems, such as storm sewers. Although sometimes triggered by events such as flash flooding or snowmelt, urban flooding is a condition, characterized by its repetitive and systemic impacts on communities, that can happen regardless of whether or not affected communities are located within designated floodplains or near any body of water. Aside from potential overflow of rivers and lakes, snowmelt, stormwater or water released from

damaged water mains may accumulate on property and in public rights-of-way, seep through building walls and floors, or backup into buildings through sewer pipes, toilets and sinks.

A. Downslope Factor

Water flowing downhill ultimately encounters downstream conditions slowing movement. The final limitation is often the ocean or a natural or artificial lake. Elevation changes such as tidal fluctuations are significant determinants of coastal and estuarine flooding. Less predictable events like tsunamis and storm surges may also cause elevation changes in large bodies of water. Elevation of flowing water is controlled by the geometry of the flow channel. Flow channel restrictions like bridges and canyons tend to control water elevation above the restriction. The actual control point for any given reach of the drainage may change with changing water elevation, so a closer point may control for lower water levels until a more distant point controls at higher water levels. Effective flood channel geometry may be changed by growth of vegetation, accumulation of ice or debris, or construction of bridges, buildings, or levees within the flood channel.

B. Flood safety planning

At the most basic level, the best defense against floods is to seek higher ground for high-value uses while balancing the foreseeable risks with the benefits of occupying flood hazard zones. Critical community-safety facilities, such as hospitals, emergency-operations centers, and police, fire, and rescue services, should be built in areas least at risk of flooding. Structures, such as bridges, that must unavoidably be in flood hazard areas should be designed to withstand flooding. Areas most at risk for flooding could be put to valuable uses that could be abandoned temporarily as people retreat to safer areas when a flood is imminent.

Planning for flood safety involves many aspects of analysis and engineering, including:

a. observation of previous and present flood heights and inundated areas,
b. statistical, hydrologic, and hydraulic model analyses,
c. mapping inundated areas and flood heights for future flood scenarios,
d. long-term land use planning and regulation,
e. engineering design and construction of structures to control or withstand flooding,
f. intermediate-term monitoring, forecasting, and emergency-response planning, and
g. short-term monitoring, warning, and response operations.

4. Survey

This survey not only about flooding or fisherman, but also about the infrastructure and transportasi, etc.

A. Fishing Boat

The first is about the transportation of fishermen, or fishing boats used to catch fish which will then be sold to "Tempat Pelelangan Ikan(TPI)" at Tambak Lorok.

Fig 2. Parking place boat

Fig 3. The types of boats used

Fig 4. Personal boat

Fig 5. Other personal boat

B. Drainage

Tambak Lorok drainage system can be said to be very bad, because in every ditch or stream disposal there full of rubbish. And it makes the flow is not smooth and clogged drainage. And it is one of the factors of flooding in the region.

Fig 6. Drainage full of trash

C. Water Supply

Tambak Lorok in the use of clean water they get from "Sumur Artesis". Both are used for drinking, washing or bathing and other activities. It is derived from the pipe channeled from the sea. And because the water comes from the sea, the water also has a salty taste.

Fig 7. The shape of "Sumur Artesis"

D. Road

Tambak Lorok road conditions still need much improvement. Almost all the way there is of paving or soil. And because people do not understand, then they lifted up the road together so that the streets are not flooded. However, it will make their home will be lower than the road.

Fig 8. Paving road conditions

Fig 9. Dirt road conditins

E. Waste management

Waste management system in the Tambak Lorok, there are differences in some communities. There are collection and reuse. But others do not want to know and then discarded at will.

Fig 10. Sewage treatment by one of the residents

Fig 11. Sewage treatment by one of the residents

Fig 12. A pile of garbage next to the house

Fig 13. Garbage on the water

F. Land subsidance

Land subsidence in Tambak Lorok is very bad, even the people who live there have to elevate his home on average 2 to 3 times per 5 years. Even then if they have the money to renovate their homes.

Fig 13. One of the houses to be elevated due to a decrease in soil

Fig 14. The house should be abandoned because it was submerged by water

G. TPI (Tempat Pelelangan Ikan)

Tambak Lorok has two type. Namely the new TPI and old TPI long. Old TPI is still used by the community, but the new TPI is now no longer used, because submerged by seawater.

Fig 15. Old TPI

Fig 16. New TPI

5. Floating Stage

From problem occuring the region , required an appropriate solution to adapt from the problem

Things that can do is not about to fix the problem " rob " but more focus to minimize the effect on the lives of people in the area.

Adaptation in this case may be more appropriate for directing the measures immediately in order to anticipate the impact of sea level rise in coastal areas, a form of adaptation completion the problem with a simple construction of residential houses in accordance with the state so that people who stay in the area not had to move to another region.

"Then how the concept of adaptation we mean?"

Floating stage house construction system as an adaptation efforts to flood as a result of increase of sea water

The concept of floating building is one way of adaptation attempts the phenomenon of natural disasters "rob", the implementation of this concept needs to be supported with a variety of ingredients, preparations and modification.

- Foundation and Sloop

  The foundation of the floating house will be modify so the structure will be flexible or easy to raise and lower the building.High dimensional pile foundation of1.5 meters and is modified to have a hole in the middle of foundations as deep as 1.3 meters and larger diameter (± 0.5 cm) from the size of the main pillar of building houses on stilts above (> 15 cm).The function of the holes on this foundation as a pillar of the main column enter the home stage.

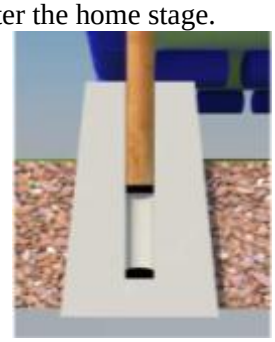

Figure 17: Foundations Home Floating Stage, Hole on Foundations For The Pole Rests Main House

- Rubber Pads

  Rubber pads is the latest technology that used for protection of buildings impact earthquakes. Made from a combination of natural rubber plates and steel plates . The rubber pads set on each main pillar stage houses and the foundation that has made

hole pillar (15 cm). Rubber pads willReduce of a direct impact between the pillar and foundation thats can make the buildings above are not balanced or even damaged.

Figure 18: Rubber pads Technology and Its Application in Earthquake Resistant Buildings

- Plastic Drum

  Buoys in residential buildings is placed under the floor of a house and has a function that occurs when the flood happen so the building will go up and the water does not get into the house. Size used in the design of this house diameter of 50 cm and the hight 83 cm.

Figure 19: Buoy Placed Under House Flood

- Chain Hook

  The function a chain hook on this house is event of a flood and rob a very large (more than 2 meters) and house floating stage up so high that the main column pole ± 1.3 meters originally embedded in the foundation up and exceed these limits . With this chain hook, houses floating stage will stay in the starting position and not swept away in the event of floods and tidal.

Figure 20: Chain hook Placed in the Lower House. Serves As The increase in water Exceeds Buffer Pole Hole In The Foundation

Simulation:

The floating stage or floating house will be applicated in flooding area (rob area). The waters from rob make the houses will be gone slowly until the water have a same high between the blue barrels, so the house will go up follow the elevation of the water slowly.

The distance of blue barrels from the land is 50 centimeters and the hole of foundation as the serve with 1,3 meters, so the elevation of rob is 1,8 meters. And it will be save with the rope underwater

.

6. CONCLUSION

The conclusion of this paper is the village of Tambak Lorok as the ocean has a lot of problems that result in many aspects. Especially ecology and economy. That requires a very detailed plan about this. Is Tambak Lorok farm community must move from there or they remain with the requirements for a well-structured improvement, both in its implementation by the government and by the community of Tambak Lorok Lorok custody itself.